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High-pressure influence on the rate of diels-alder cycloaddition reactions of maleic anhydride with some dienes

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Abstract

The rate constants for temperature and pressure range, enthalpy, entropy, and volume of activation and reaction were measured in toluene solution for the Diels-Alder cycloaddition reaction of maleic anhydride (1) with a very active diene, 9,10-dimethylanthracene (4), and with a very inactive diene, 9-phenylanthracene (6), which is less reactive in the reaction with 1 by five orders of magnitude. Reaction rates under pressure up to 2600 bar were measured by using a high-pressure optical cell, adjusted to a UV-spectrophotometer. The volume of reaction was determined by two independent methods: by the difference of the partial molar volumes of the reactants and by the dependence of a specific volume of solution on the adduct concentration during the reaction. All parameters of activation and reaction were discussed. © 2013 Wiley Periodicals, Inc.

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